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Crowdsourcing Solutions For Disaster Response: Examples And Lessons For The US Government

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Abstract

Crowdsourcing has become a quick and efficient way to solve a wide variety of problems - technical solutions, social and economic actions, fundraising and troubleshooting of numerous issues that affect both the private and the public sectors. US government is now actively using crowdsourcing to solve complex problems that previously had to be handled by a limited circle of professionals. This paper outlines several examples of how a Department of Defense project headquartered at the National Defense University is using crowdsourcing for solutions to disaster response problems.

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1. Introduction

National Defense University's Center for Technology and National Security Policy (CTNSP) is home to TIDES program - Transformative Innovation for Development and Emergency Support - a Department of Defense research project dedicated to open-source knowledge sharing to promote sustainable support to populations under stress – post-conflict, post-disaster, or impoverished. The project provides reach-back “knowledge on demand” to decision-makers and those working in the field. It encourages public-private, whole-of-government, and trans-national approaches to achieve unity of action among diverse organizations where there is no unity of control. Launched in

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2007, it has accumulated years of experience related to non-traditional ways to tackle problems faced by the Department of Defense [1].

TIDES is part of a broader project called STAR-TIDES (Sharing to Accelerate Research). TIDES encourages innovation by tapping into a global network of distributed talent. Central to the STAR-TIDES efforts is the network of thousands of nodes working on humanitarian assistance, disaster relief and emergency response issues - this network includes US government, military and civilian contacts, their international counterparts, as well as a wide variety of private, public and NGO-sector organizations, start-ups and individuals. TIDES often turns to this network for solutions to problems encountered by the DoD in civil-military engagements during and after disasters, as well as to inform DoD of the latest technology innovations and breakthroughs that can facilitate the US military's work in non-traditional settings, including domestic and international disasters and emergencies. This network is at the heart of TIDES project experience with crowdsourcing solutions to disaster response problems.

2. Examples of turning to the crowd for solutions

2.1. Camp Roberts-RELIEF/JIFX interagency field experiments

Over the past four years, TIDES has been involved in efforts to familiarize our DoD colleagues with non-government, non-military efforts to crowdsourced solutions in disaster settings. TIDES is part of a broader DoD-sponsored set of quarterly field experiments, managed by the Naval Postgraduate School in Monterey, CA. The purpose of this program, held at Camp Roberts, CA, is to provide a field experimentation resource for the Department of Defense and other federal agencies. In addition, State Department, DHS, FEMA, National Geospatial Intelligence Agency, local and international emergency management, disaster response and humanitarian assistance organizations attend to create an innovative cooperative learning environment [2].

During November 2010- May 2012 field experiments, TIDES, NPS and our interagency/non-DoD partners worked to develop an informal agreement to allow the US Government to release imagery to help catalyze voluntary geographic information initiatives during emergencies. When the earthquake struck Haiti in January 2010, there were no useful post-disaster maps of the dense urban environments there. Because the private sector released high-resolution imagery and made it free to trace, 640 volunteers in the Humanitarian OpenStreetMap (HotOSM) community surged to build a detailed map of Haiti in two and a half weeks. They completed over a year of cartographic work in two weeks—less time than it would have taken the US Government to write a contract--and they did it for no cost. National Geospatial Intelligence Agency and Department of State's Humanitarian Information Unit (HIU) worked over consecutive Camp Roberts events for approximately a year and a half to develop a process by which the US Government could systematically release satellite imagery to communities like OpenStreetMap to help catalyze these types of free volunteer mapping efforts after future disasters [3].

This effort resulted in an informal agreement among agencies that has turned into a semi-official workflow managed from the State Department HIU. This development created a policy implication for the Department of Defense and US Government agencies active in disaster response: the use of satellite imagery to catalyze new mapping data in a crisis zone is under active policy review at NGA and State [4].

Subsequently, work on crowdsourcing disaster imagery and data continued. During February 2012 - August 2012 field experiments, TIDES and our DoD and non-DoD partners, this time involving FEMA, Civil Air Patrol, and Humanitarian OpenStreetMap Team. FEMA saw NGA's success with volunteer mapping and moved to create a domestic capability that could collect and collate aerial imagery. Working with the Civil Air Patrol (CAP), FEMA and NGA helped to rewrite the CAP's Concept of Operations (CONOPS) for some of their traditional mission assignments (the CAP collects a significant amount of post-disaster assessment imagery within the U.S.) [5]. In an ad hoc (unplanned) experiment during May 2012 Camp Roberts-East event, ran and managed by the TIDES team, members of the Humanitarian OpenStreetMap Team showed a process called MapMill for crowdsourcing the categorization of the CAP imagery according to the level of damage shown in the photos [6]. This improvised rapid

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